



BUCK CONVERTER USING LM2596

By
Hari Ram Nikil (RA2411004010463)
Vaibhav Balaji (RA2411004010467)
T.D Karthikeyan (RA2411004104085)



PROJECT OVERVIEW

Objective:

To design and develop a DC-DC buck converter PCB that efficiently steps down higher input voltage to a lower, stable output using the LM2596 regulator.

Key Features:

- Based on LM2596 step-down regulator IC
- Input voltage range: 4V – 40V
- Output voltage (adjustable): 1.25V – 37V
- Maximum output current: 3A
- High efficiency up to 90%
- Compact and low-cost PCB design

Applications:

- Arduino & microcontroller power supply
- Battery charging circuits
- Embedded & IoT systems
- LED drivers, portable devices

DESIGN & WORKING

Circuit Design:

LM2596 acts as the main switching regulator.

Inductor, PN Junction diode, and capacitors form the buck topology.

Potentiometer used to adjust output voltage.

PCB designed in EasyEDA for compact layout and heat dissipation.

Working Principle:

The LM2596 switches at a high frequency (~150 kHz).

Converts the input DC voltage to a pulsed waveform, filtered by the inductor and capacitor to produce smooth, lower DC output.

The feedback pin maintains a constant voltage output.

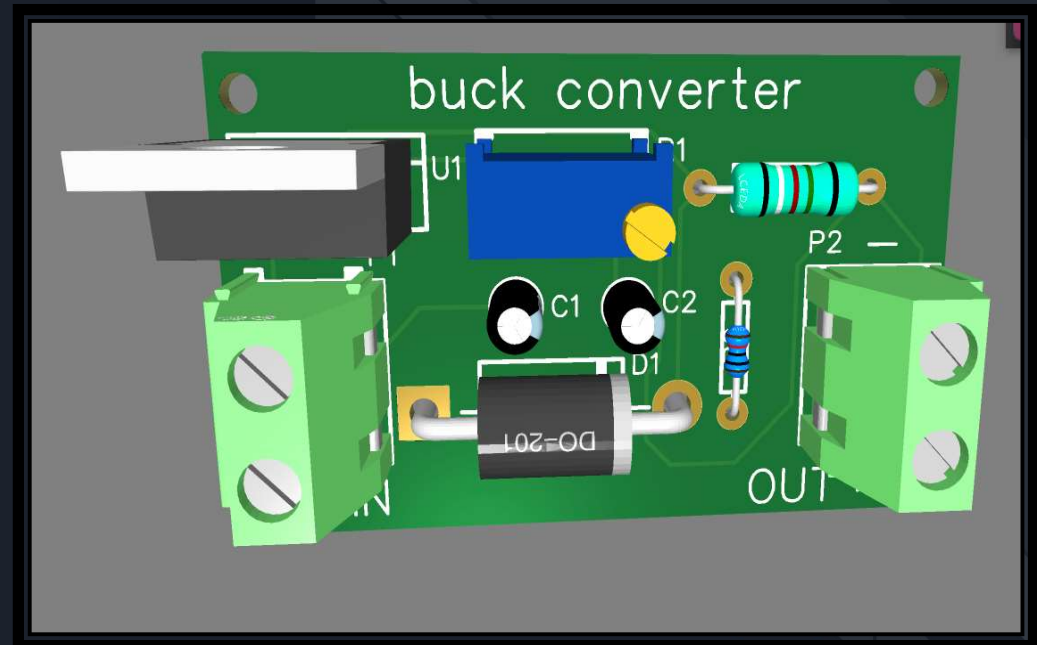
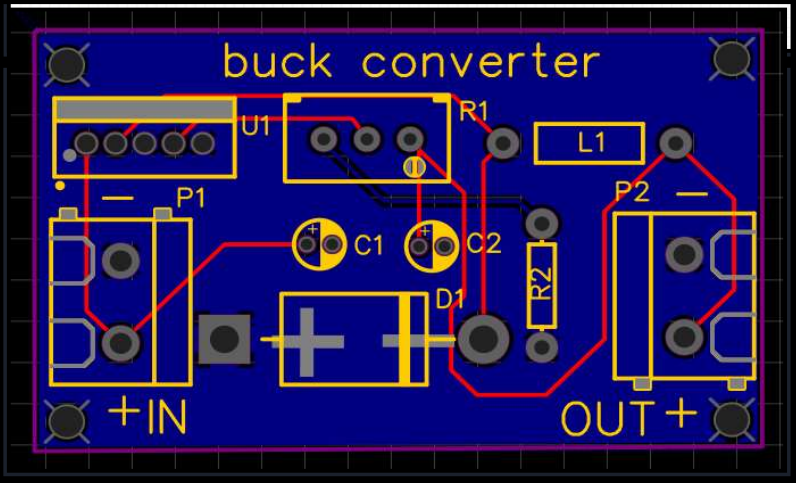
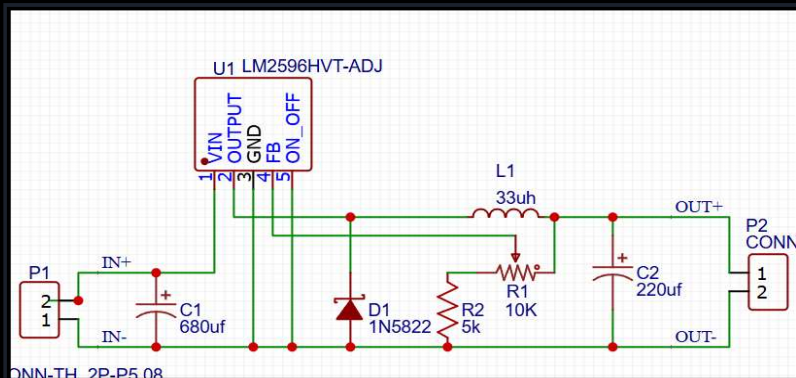
Future Scope:

Adding display for voltage/current monitoring

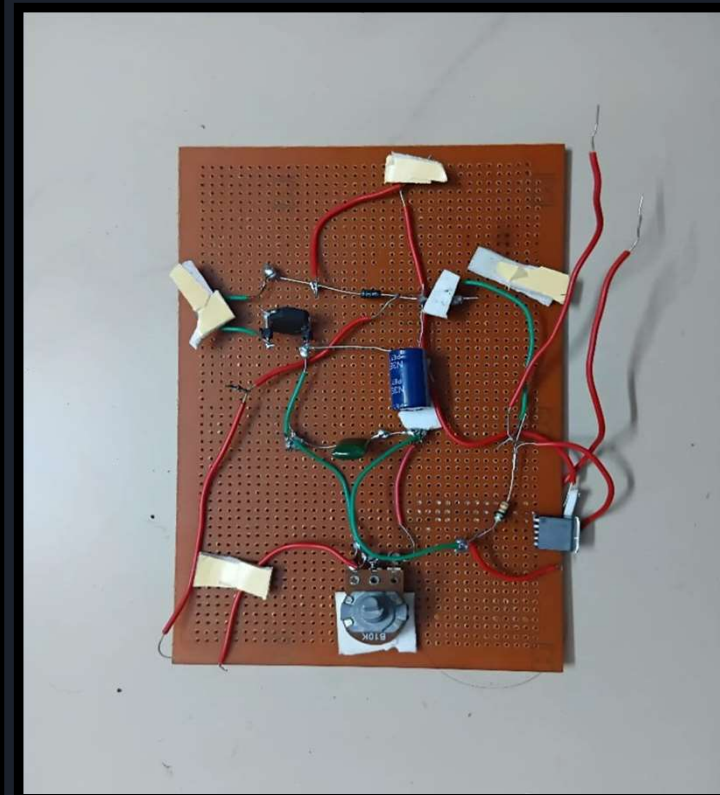
Integration with USB/Type-C output

CIRCUIT AND PCB LAYOUT

Pcb layout and its 3d view, designed using EasyEDA software



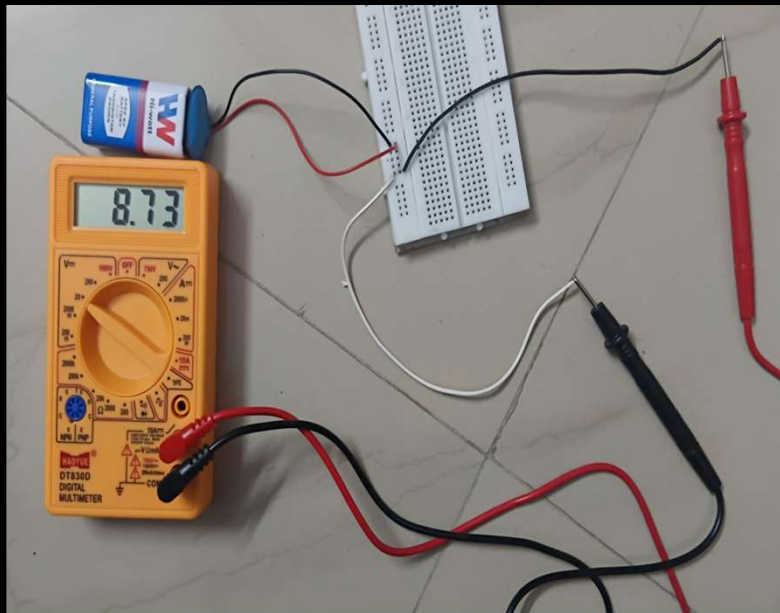
DOT BOARD INTEGRATION



Here's an overall circuit construction of the Buck Converter Circuit in a Dot Board

TESTING AND RESULTS

Input Voltage Measurement



Output Voltage Measurement

